

*A Diptych Dial
for Latitude 33
and Longitude 108.2 and 112.2
with a legal meridian of
105.0 West*

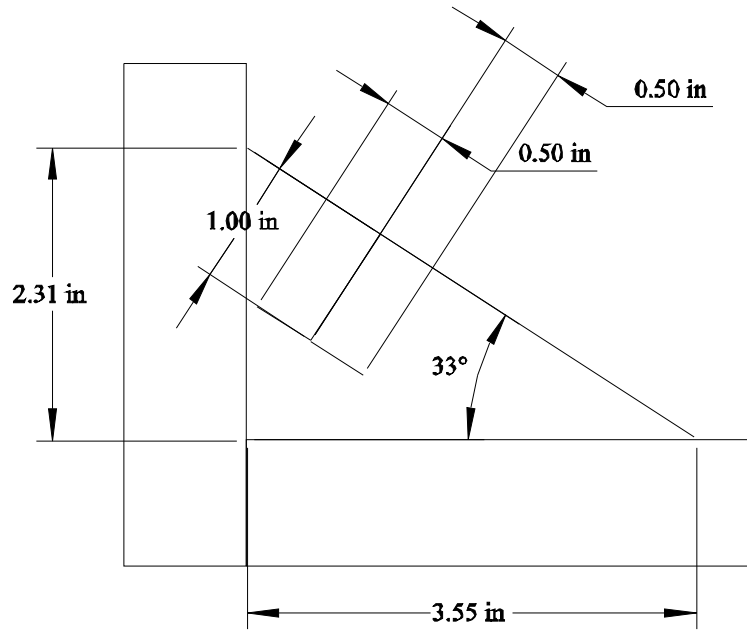


This portable sundial was made as an instructional aid for a class given at WNMU, and is in essence a physical model of Durer's depiction.

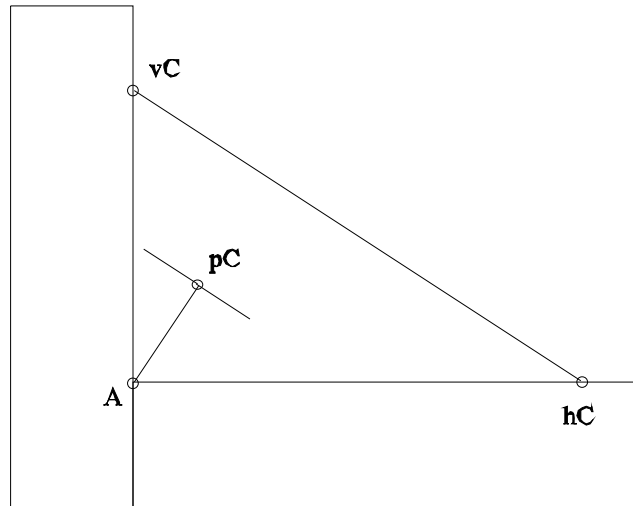
Designed for Silver City, NM longitude, the latitude was however the midpoint between Silver City and Phoenix, AZ.

An EOT table on the back of the dial has two sections. A pure EOT for Silver City, and an EOT modified with the Phoenix/Silver City longitude difference.

The first step was to see how a longitude 33 gnomon would best be positioned on both the vertical and horizontal dials. TurboCAD was used for this work.

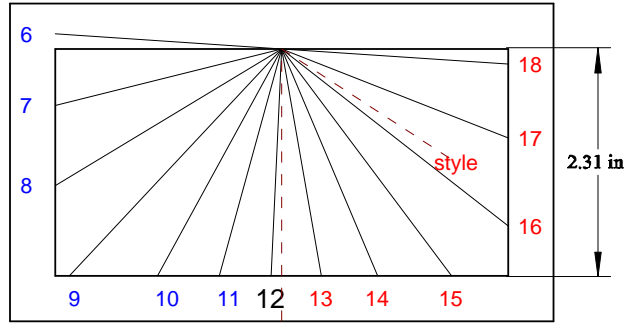


The h-dial center is best set at 3.5 inches approximately from the junction of the h and v dials. And the v-dial's center is best set at 2.3 inches from the junction, or thereabouts.



A polar dial is best set with a nodus to dial plate linear distance of about 1.0 inches, or thereabouts This may change.

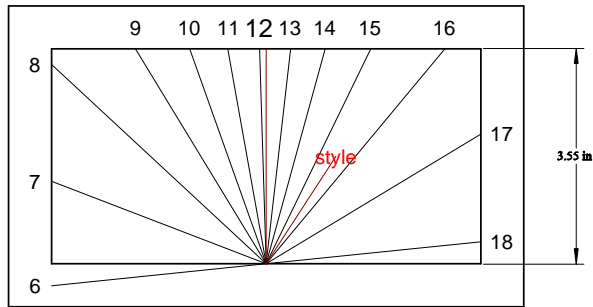
Armed with these measurements, a DeltaCAD macro was run for the v-dial, h-dial, and p-dial.



Hour and hour line angle VERTICAL NON DECLINER

6	7	8	9	10	11	12	13	14	15	16	17	18
86.2	-76.0	-58.9	-43.2	-28.8	-15.4	-02.7	09.9	23.0	36.9	52.0	68.6	86.2

Lat: 33.0 Long: 108.2 co-lat [sh]: 057.0

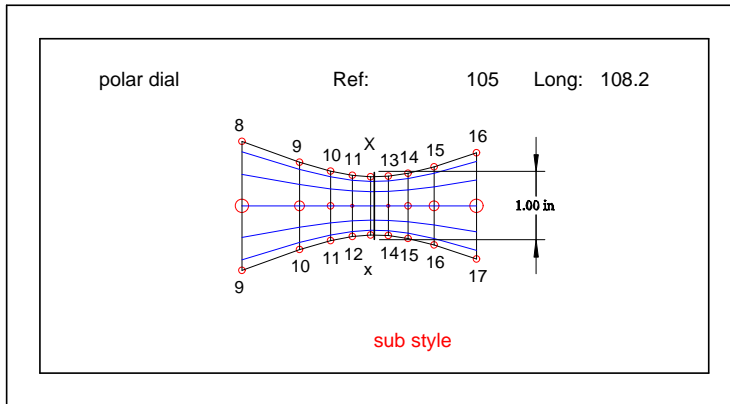


Simplest hour line angle H-DIAL

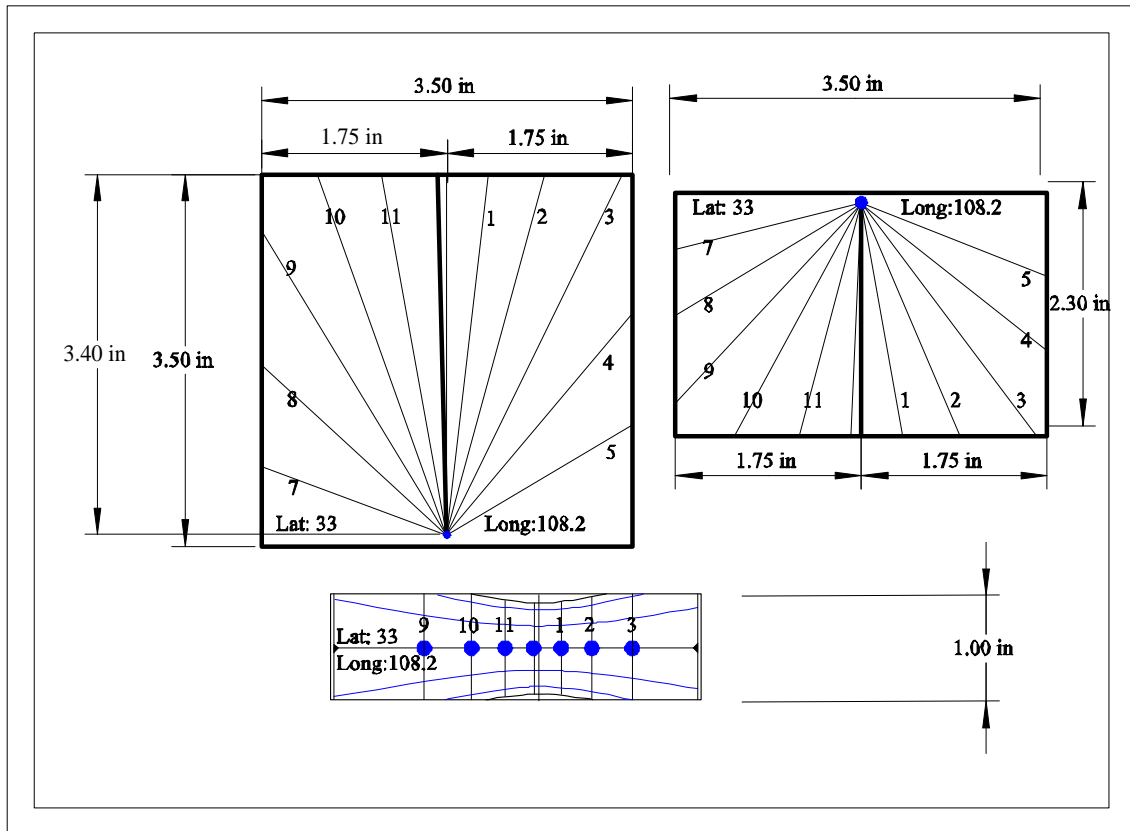
6	7	8	9	10	11	12	13	14	15	16	17	18
84.1	-69.0	-47.2	-31.3	-19.6	-10.2	-01.7	06.5	15.4	26.0	39.8	58.9	84.1

Hours below horizontal use the 90 reference line below horizontal.

Lat: 33.0 Long: 108.2



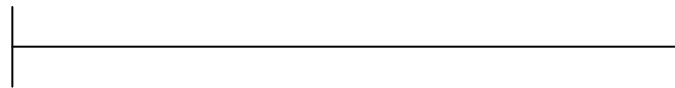
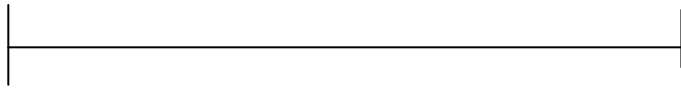
The three DeltaCAD dial plates were copied with “select” and “copy” and then inserted into a TurboCAD drawing area using “paste special” and a “windows meta-file” option.



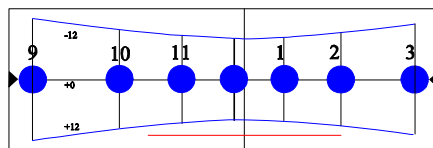
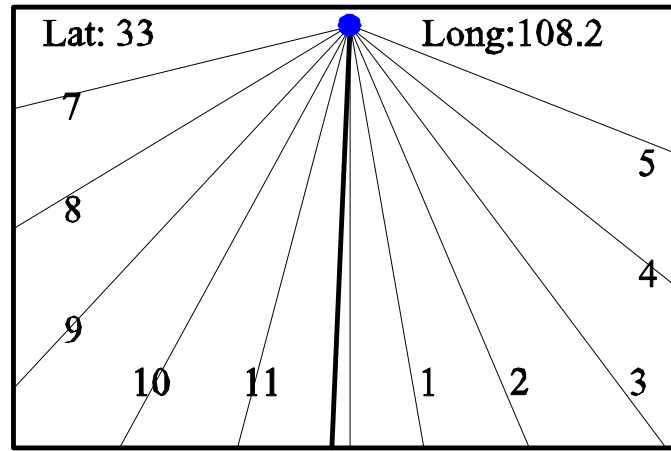
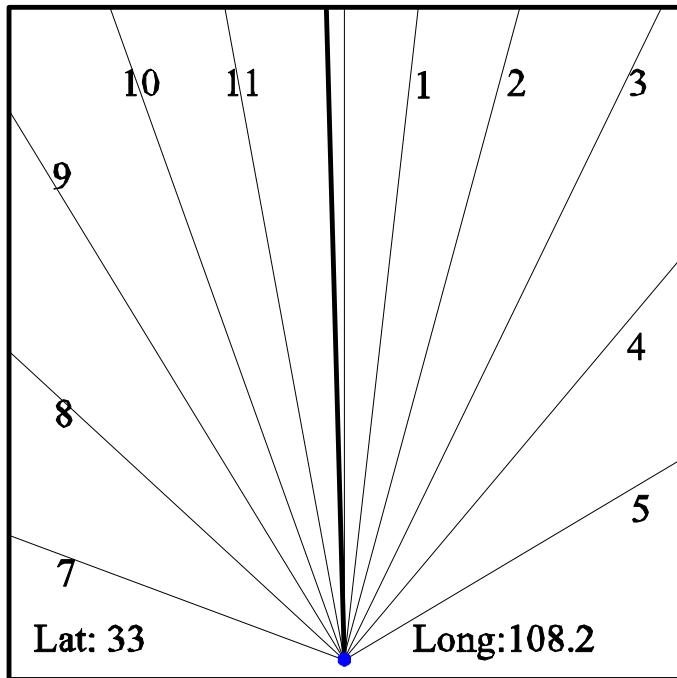
These dial plates were then scaled to the dimensions stated earlier. TurboCAD is easier to use than DeltaCAD when it comes to scaling a drawing since the dimensions are associative.

The true north south line was verified as being centered in the dial plate.

The objects, without all the dimension lines, but with some yardsticks, were then copied and scaling validated, as on the next page.

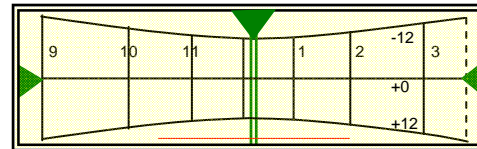
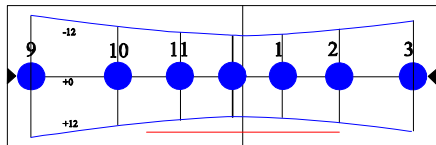
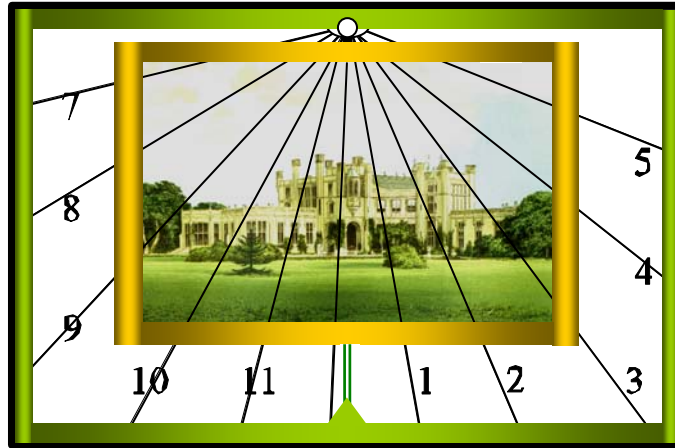
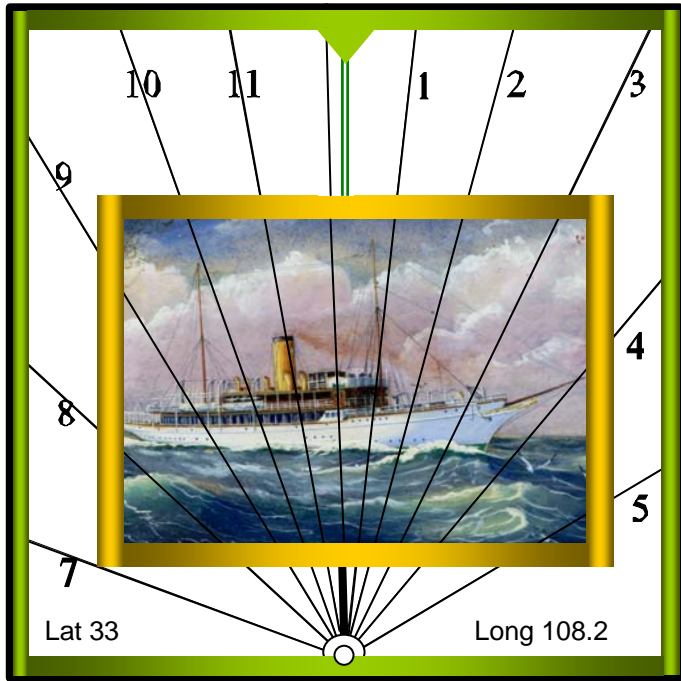


a 3.5 inch yardstick



a 1 inch yardstick

Rescaled to correct dimensions, and polar dial plate re drafted.



Pictures added

Pictures were added to add interest to the dial. As a matter of interest, the horizontal dial plate has a picture of the S. Y. Conqueror, the yacht H. G. Selfridge owned. It was taken from his cigarette box.

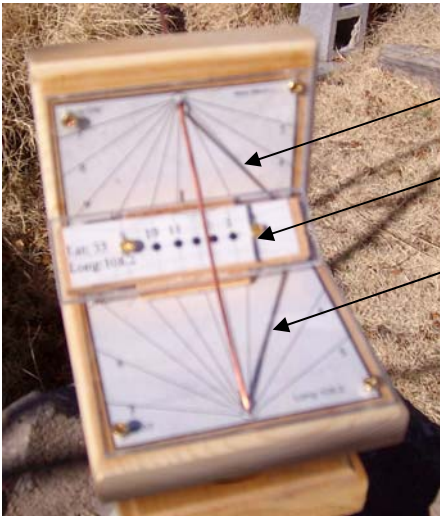
The vertical dial has a picture of Highcliffe Castle, which was H. G. Selfridge's country home.

H. G. Selfridge, founder of the Selfridge's department store in London, England was the great grandfather of the Illustrating Shadows author.

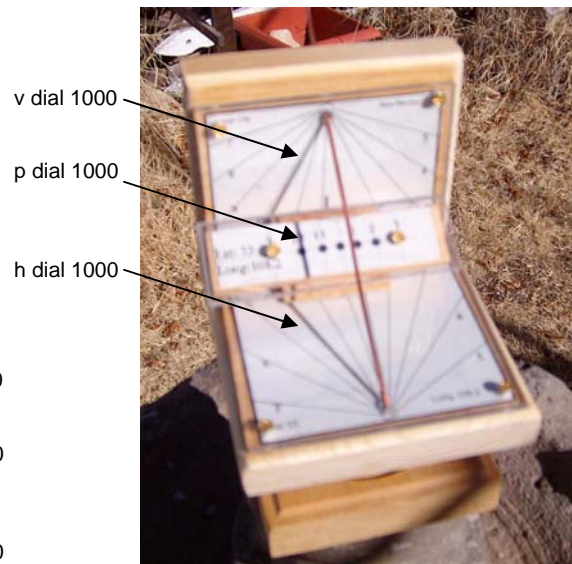
The dial plates were printed (absent the pictures), and then placed on the wood structure, plexi glass placed over them, and drilled for the brass screws. Also, gnomon holes were drilled at an angle to ensure the gnomon (copper wire), met at the dial centers. Then the dial was tested.



The pieces before assembly



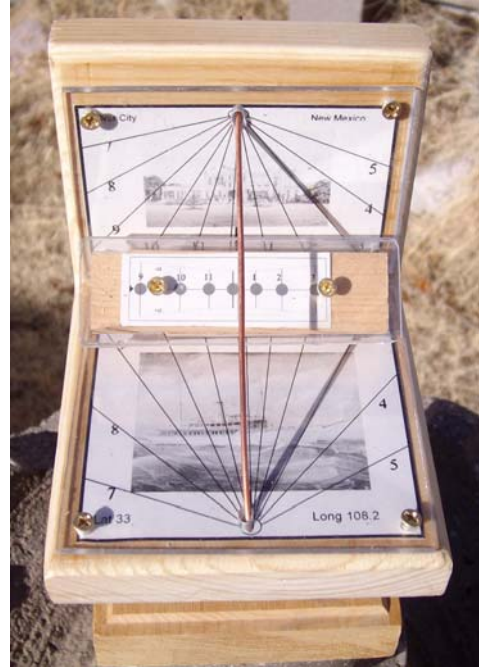
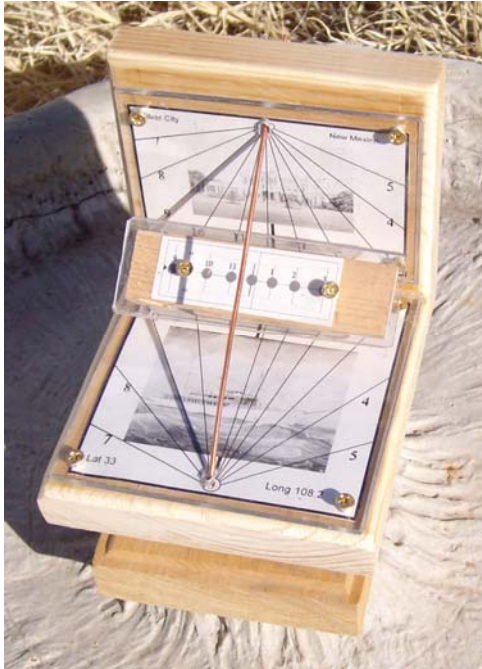
At 1500 hrs, the h-dial, p-dial and v-dial all agree



At 1000 hrs, the h-dial, p-dial and v-dial all agree

Most diptych dials do not have a polar dial as well. This dial was made as an example of Durer's model for a class to be given on gnomonics at the local university.

After testing, the final dial plates, with pictures. were printed. The polar dial was redone for cosmetic purposes.



Above to the left is 0900 (9 am) in the final dial, and above to the right is 1500 (3 pm). The pictures are in place on the v and the h dials, and the polar dial is now more aesthetic.

	Silver City 10.2°E			Phoenix, AZ 11.8°E		
	5th	15th	25th	5th	15th	25th
JAN	5.1	9.0	12.0	21.1	25.0	28.0
FEB	13.9	14.2	13.4	29.9	30.2	29.4
MAR	11.9	9.3	6.3	27.9	25.3	22.3
APR	2.8	0.0	-2.3	18.8	16.0	13.7
MAY	-3.6	-4.0	-3.5	12.4	12.0	12.5
JUN	-2.0	-0.1	2.0	14.0	15.9	18.0
JLY	3.9	5.3	5.9	19.9	21.3	21.9
AUG	5.4	3.8	1.4	21.4	19.8	17.4
SEP	-2.2	-5.8	-9.4	13.8	10.2	6.6
OCT	-12.7	-15.1	-16.5	3.3	0.9	-0.5
NOV	-16.5	-15.1	-12.5	-0.5	0.9	3.5
DEC	-8.8	-4.5	0.2	7.2	11.5	16.2

This dial was designed for the mid latitude between Phoenix AZ, and Silver City NM. The corrections are thus pure EOT for Silver City (Long=108.2, the design latitude) and EOT + the Phoenix and Silver City longitudinal distance, a 16 minute difference.

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December 20, 2009

The spreadsheet to the left was derived from the:-

EOTandLONG

worksheet of the:-

illustrating-shadows.xls
illustrating-shadows.ods

main spreadsheets that modify the EOT with a longitude shift.

The above EOT tables were placed on the rear of the dial's vertical dial plate. The dial was designed for longitude 108.2 with a legal meridian of 105, thus the Silver City correction table is the EOT itself. When used in Phoenix, there is a longitudinal difference of 4.0 degrees, or 16 minutes (at 4 minutes per degree). The latitudes were 32.75 for Silver City and 33.5 for Phoenix, which are somewhat close, so a mid point latitude was used.